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Sumio Iijima

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WENDEROTH, LIND & PONACK, L.L.P.

1030 15th Street, N.W.,

Suite 400 East

Washington, DC 20005-1503

EXAMINER

MILLER, DANIEL H

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**Please find below and/or attached an Office communication concerning this application or proceeding.**

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**BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES**

Application Number: 10/560,808  
Filing Date: March 20, 2006  
Appellant(s): IIJIMA ET AL.

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For Appellant

**EXAMINER'S ANSWER**

This is in response to the appeal brief filed 6/25/2009 appealing from the Office action mailed 9/15/2008.

**(1) Real Party in Interest**

A statement identifying by name the real party in interest is contained in the brief.

**(2) Related Appeals and Interferences**

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

**(3) Status of Claims**

The statement of the status of claims contained in the brief is correct.

**(4) Status of Amendments After Final**

No amendment after final has been filed.

**(5) Summary of Claimed Subject Matter**

The summary of claimed subject matter contained in the brief is correct.

**(6) Grounds of Rejection to be Reviewed on Appeal**

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

**(7) Claims Appendix**

The copy of the appealed claims contained in the Appendix to the brief is correct.

**(8) Evidence Relied Upon**

Naotake Kawamura (US 6,706,431) March 16, 2004

**(9) Grounds of Rejection**

The following ground(s) of rejection are applicable to the appealed claims:

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 6-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kawamura (US 6,706,431).

Kawamura teaches a fuel cell having an electrode or catalyst formed from nanohorns and also comprising fullerene encapsulated Lanthanum (abstract and column 4 lines 15-20, 45-50). The material can be formed into an electrode using glue to adhere the electrode together; or the inherent tendency of carbonaceous materials to conglomerate together via Van Der Waal forces. Therefore, the Lanthanum filled fullerene and hence the Lanthanum would be considered to be deposited on the single walled nanohorn, or in the alternative, it would be obvious to provide a single walled nanohorn with Lanthanum in order to maximize catalytic effect of carbon material. The addition of Lanthanum to fullerenes and other family of carbon allows the composite to function as a hydrogen storage electrode (column 4 line 50-60).

Regarding claim 7, it would have been obvious to one of ordinary skill in the art at the time of the invention to optimize the percentage of Lanthanum in order to obtain the level of catalytic effect desired and in so doing obtain the broad molar ratio claimed by applicant. It has been held that discovering an optimum value of a result effective

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variable involves only routine skill in the art. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

It is noted that methane adsorptivity is an inherent to the claimed material and the trait is not otherwise indicative of patentability. Since the structure of Kawamura is substantially similar to applicants it would be expected to have similar methane adsorptivity properties. No patentable distinction is seen.

#### **(10) Response to Argument**

The heart of applicant's argument are that, Even "if a fullerene filled with lanthanum is mixed with a single walled nanohorn", as suggested by the examiner, "this would still not describe a lanthanide metal being deposited on a single walled nanohorn as presently claimed but rather a lanthanide filled fullerene mixed with or deposited on a carbon nanohorn." The examiner disagrees the metal would interact with the nanohorns as the cage structure of the nanohorns is open and would still allow for the metal to be on the nanohorn structure. Further, notwithstanding that argument applicant does not distinguish that the layer is located directly on the nanohorn as argued or otherwise define a structure that would distinguish between the claimed invention and Kawamura.

It is noted that methane adsorptivity is inherent to the claimed material and the trait is not otherwise indicative of patentability. Since the structure of Kawamura is

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substantially similar to applicants it would be expected to have similar methane adsorptivity properties. No patentable distinction is seen.

Applicant has not addressed why it would not be obvious to provide nanohorns with a lanthanide attached in a manner similar to the fullerene with lanthanide, as disclosed by applicant or why the lanthanide fullerene taught by the reference in contact with aggregates of nanohorns of Kawamura would not meet the claim limitations.

It would be obvious to provide a single walled nanohorn with Lanthanum in order to maximize catalytic effect of carbon material. The addition of Lanthanum to fullerenes and other family of carbon allotropes allow the composite to function as a hydrogen storage electrode (column 4 line 50-60). Further, the lanthanide fullerene material has the advantage of being capable of functioning in extreme acidic conditions (column 4 lines 55-60).

Applicant has argued that the reference does not teach a mixture of carbon element. However, the reference discloses mixing the fullerenes with other carbon materials to produce a catalytic effect (see column 4 lines 50-60). Further, "(i)t is prima facie obvious to combine two compositions each of which is taught by the prior art to be useful for the same purpose, in order to form a third composition to be used for the very same purpose.... [T]he idea of combining them flows logically from their having been individually taught in the prior art." In re Kerkhoven, 626 F.2d 846, 850, 205 USPQ 1069, 1072 (CCPA 1980).

Applicant further argues that different allotropes of carbons are known by one of ordinary skill in the art to have different properties, especially electrical properties.

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However, the examiner does not believe that differing properties of carbon allotropes would prevent one of ordinary skill from substituting their use, in fact it should motivate one of ordinary skill, to substitute allotropes of carbon for the purpose of maximizing the catalytic effect of the material by providing the best carbon allotrope material for the particular application.

Regarding claim 7, it would have been obvious to one of ordinary skill in the art at the time of the invention to optimize the percentage of Lanthanum in order to obtain the level of catalytic effect desired and in so doing obtain the broad molar ratio claimed by applicant. It has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980). As applicant admits in his own arguments (see brief page 11) "it is well known that the methane adsorptivity of SWNH is much larger than its hydrogen adsorptivity" proving motivation to substitute the lanthanide and fullerenes or mix them with nanohorns in the well known process of methane adsorption in order to maximize the catalytic effect. One of ordinary skill would provide a molar concentration of lanthanide that corresponded to the highest catalytic effect and hence arrive at the claimed molar ratio.

No patentable distinction is seen.

Rejection maintained.

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**(11) Related Proceeding(s) Appendix**

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

/Daniel Miller/  
Examiner, Art Unit 1794

Conferees:

/Keith D. Hendricks/  
Supervisory Patent Examiner, Art Unit 1794

/David R. Sample/  
Supervisory Patent Examiner, Art Unit 1794

/JENNIFER MCNEIL/  
Supervisory Patent Examiner, Art Unit 1794